

Responding to that challenge, the Scripps team injected both TLR-disabled and normal mice with a chemically modified protein antigen and other immune boosters, including Freund's complete adjuvant (FCA), an oily microbial mixture that includes TLR ligands, and Ribi adjuvant, a TLR4 activator used in a hepatitis B vaccine. They saw robust antibody responses to the antigen for all the adjuvants in both types of mice. "We were surprised," Gavin says. "We too had been sucked into the

misconception that TLRs are the only road there is" to a strong antibody response.

Medzhitov believes the study is fatally flawed, however. The robust B-cell responses in the TLR-signaling mutants, he claims, result from the use of a chemically modified protein. If Gavin's team were to use a regular antigen, he predicts, they would see a big difference between the mice. "TLRs are not the only possible target for vaccines," Medzhitov maintains, "but as far as we know, most of the

major adjuvants work through TLRs."

Whether TLR stimulants are safe and effective adjuvants should be resolved as large-scale human trials come to a close in the next several years. But if Gavin and her colleagues are correct, biotech firms may want to shift gears. "TLRs are moving rapidly in the clinic," Krieg says. "But could there be something better in the future? Absolutely. Clearly, you can generate strong immune responses without TLRs."

—INGRID WICKELGREN

WILDLIFE CONSERVATION

River Dolphins Down for the Count, and Perhaps Out

The world's rarest cetacean is nowhere to be found. Last week, a 3500-kilometer survey along China's Yangtze River failed to turn up a single river dolphin, or baiji (*Lipotes vexillifer*). "It's going to take a rescue effort of epic proportions to save this species," says Karen Baragona, director of the World Wildlife Fund's China programs. But it may already be too late for the nearly blind, pale creature. Expedition organizer August Pfluger, head of the Swiss-based baiji.org Foundation, says bluntly: "The baiji is functionally extinct."

The gloomy appraisal has prompted researchers to redouble efforts to save another endangered Yangtze cetacean, the finless porpoise, known in China as the jiangzhu, or river pig. (Cetaceans include whales, dolphins, and porpoises.) The survey recorded fewer than 300 of the world's only freshwater porpoise (*Neophocaena phocaenoides asiatorientalis*). Experts now estimate a total population of at most 1400, a 50% decline from the last major survey in 1991. "Without further intervention, the finless porpoise will be the next baiji," says survey member Zhang Xianfeng of the Wuhan Institute of Hydrobiology.

Although biologists knew the baiji was scarce, coming home empty-handed after a 6-week survey up and down the Yangtze was unexpected. A team from China, the United Kingdom, and the United States had planned to follow the survey with a \$400,000 "rescue mission" to transfer any captured baiji to Tian-e-Zhou Lake in Hubei Province, a sanctuary holding 30 finless porpoises. That plan has been shelved, says Pfluger.

The baiji split from other dolphins 20 million years ago. Since then, the baiji's eyes

have shrunk to pea size. It can discern only light and dark, so it relies on a finely tuned sonar to hunt prey in the silty Yangtze. The last comprehensive survey in 1997 found 13 baiji; from this figure, experts pegged the population at fewer than 100. "For us to see zero means there might be 10" left in the wild, says survey member Barbara Taylor, a marine biologist with the U.S. National Oceanic and Atmospheric Administration (NOAA). Or, as Pfluger notes, zero may mean zero. If so, the baiji would follow the Stellar's sea cow, Caribbean monk seal, and Japanese sea lion into oblivion as the

survey, says Pitman, "we saw hundreds of fishermen using rolling hooks."

Long-term hazards are pollution and choking boat traffic. Near Poyang Lake in Jiangxi Province, connected to the Yangtze by a narrow channel, Taylor counted some 1200 boats in a span of 2 hours. Between the heavy traffic and numerous factories hard up against the lakeshore, Taylor declares Poyang the "biggest environmental disaster" she's ever seen. That's bad news, as Poyang, China's largest lake, is one of the last redoubts

of the finless porpoise:

It has the biggest intact population, estimated at 400, with 80 spotted during the survey.

Plucking the porpoise from peril won't be simple. Proposed megadams may fragment remaining populations, says Zhang. "There's no hope to

change the environmental conditions on the Yangtze," he says. Pfluger says his organization will educate fishers about the impact of illegal fishing and finance a sustainable-fishing initiative at Tian-e-Zhou Lake. There, two or three porpoises are born each year, and captive breeding has resulted in a pregnancy last year, says expedition co-director Wang Ding of the Institute of Hydrobiology. "We have to set up more seminatural reserves like Tian-e-Zhou," Wang says.

Sadly, that approach may no longer be applicable to the baiji, an apparent victim of China's booming economy and the attendant environmental degradation of a mighty river. "It seems the baiji is the only thing that is not made in China anymore," says Pitman.

—JERRY GUO

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Unhappy hunting. Expedition members search fruitlessly for signs of baiji on the hazy Yangtze River. The last baiji in captivity (inset) died in 2002.

fourth large marine mammal to go extinct in the last 3 centuries. It would be the first cetacean lost in modern times.

Although the baiji's fate is uncertain, the dangers it faces are all too apparent. The most immediate threat is the use of rolling hooks, says expedition co-director Robert Pitman, a NOAA marine biologist. These illegal fishing lines are stretched across a river and are known to snag and drown baiji. During the

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